Fig. 3 is a view taken generally along the line 3-3 of Fig. 1;

Fig. 4 is an isometric view of a blister severed from the sheet of Fig. 1 with the blister die cutter apparatus of the present invention;

Fig. 5 is a plan view of the blister of Fig. 4;

Figs. 6 and 7 are views similar to Figs. 4 and 5 but illustrating the defects that may occur in conventional blisters produced with conventional cutting apparatus;

Fig. 8 is an isometric view of the compensating blister die cutter apparatus of the present invention illustrating individual blister die cutter units (for example shown here as six in number[)] being equally spaced from each other);

Fig. 9 is an isometric view similar to Fig. 8 showing the individual blister die cutter units being slightly shifted with respect to each other illustrating how the die cutter apparatus accommodates for the shrinkage and relative movement of the blisters produced on a sheet of plastic material after the blisters are formed;

Fig. 10 is an exploded isometric view of an individual blister die cutter unit illustrated in Figs. 8 and 9;

Fig. 11 is an elevational view of an individual blister die cutter of the apparatus taken generally along the line 11-11 of Fig. 12;

Fig. 12 is a plan view Fig. 11;

Fig. 13 is an isometric view of a partially assembled blister die cutter unit shown in Figs. 10-12; and

Fig. 14 is an enlarged fragmentary view taken in the same direction as Fig. 11 showing

how the adjustment members fit through the holes in the cutter structure.

Detailed Description of the Preferred Embodiment

The drawings illustrate the compensating die cutter apparatus of the present invention illustrated generally by the reference numeral 30 and which is seen in various of the views including Figs. 8 and 9 with the apparatus 30 being made up of (in the illustrated embodiment) six individual blister die cutter units identified by the reference numerals 34, 35, 36, 37, 38 and 39.

The problem which the present invention is designed to solve comes from the nature of the sheets of plastic material illustrated at 20 in Figs. 1-3 from which individual blisters are formed. The blisters in Figs. 1, 2 and 3 are identified by the reference numeral 22.

As is understood in the blister packaging industry, it is normal to form a plurality of blisters 22 on and from a sheet of polymeric material by forming a heated sheet of the polymeric material around individual molds which form the blisters 22. In this process the polymeric material is heated to a substantially high temperature, for example on the order of 400° F which allows the sheet 20 to more easily form over the individual molds and with the assistance normally of a vacuum the individual blisters 22 are formed. The sheet is then cooled and removed from the individual dies resulting in a sheet like that shown in Fig. 1. In the cooling process, a given batch of polymeric sheet material will shrink as it is cooled and will shrink irregularly. This results in the distance from individual center lines of the individual blisters being inconsistent. In most instances after a first group of blisters have been produced from a given batch of the polymeric sheet, the individual shrinkage will be somewhat consistent for subsequent sheets. When a manufacturer next goes to another batch of polymeric material the shrinkage will again, in most cases, be

rule 54 within the rule slots 52 and keep the inside portion with the cavity in it from falling out.[.] The rule has recesses 60 provided therein which closely straddle the bridges 58. Central holes in the top board, backup plate and bottom board form a cavity 62 to receive the individual blisters 22 during a cutting operation.

Threaded members 64 are provided and extend through holes 66 in the backup plate 46 and the top board 50 and are threadably received in threaded holes 68 in the bottom board 44 to hold the top board, backup plate and bottom board together fixedly as a unit.

Adjustment members 70 in the form of threaded members extend through holes 72 in the top board 50, backup plate [47]46 and bottom board 44 and threadably connect into threaded holes 74 in the base 31. The adjustment members 70 are fixedly secured in the base 31 and are of an outer diameter which is smaller than the diameter of the holes 72 in the top board, backup plate and bottom board. This permits the blister die cutter units to move relative to the base 31. The top board, backup plate, bottom board and associated structure comprise a support member and the member 70 of a smaller diameter than holes 72 amounts to a lost motion connection connecting the support member to the base 31.

The construction of each of the blister die cutter units 34-39 as shown in Figs. 8 and 9 is identical and each is mounted to the base 31 in the same fashion. Fig. 8 illustrates the blister die cutter units 34-39 mounted on the base with identical spacing between the edges of the units. This identical spacing has been indicated by the reference numeral 77.

This spacing as a matter of example only may be on the order of 1/16" to 1/8". Fig. 14 is an enlarged fragmentary view showing the members 70 and their position in openings 72 and as

depicted in Fig. 8. In order that a die cutting operation be accomplished, the sheet 20 of blisters 22 as illustrated in Fig. 1 is brought into position in the Fig. 8 condition so that a given blister 22 fits into a given die cutter unit 34-39. Any shrinkage or movement of a blister 22 relative to another blister on the sheet 20 because of shrinkage is accommodated when a blister is pushed down into the cavity 62 of a given unit which causes that unit to shift so that a given blister fits into a given cavity in a symmetrical fashion. This causes the various die cutter units 34-39 to shift relative to each other as illustrated in Fig. 9 which positions each blister in a cavity of a given die cutter unit 34-39 in a symmetrical fashion so that a product like that illustrated in Figs. 4 and 5 is produced when the cutting operation is effected.

The cutting operation is conventional in nature in that the apparatus as illustrated in Figs. 8 and 9 is mounted on the platen of a die cutting mechanism and the platen is normally moved toward a planar surface. This causes the cutting edges 56 of the individual die cutter units to sever the blisters 22 from the sheet 20. When the operation is completed and the platen is moved away, the ejection rubber 53 of each unit 34-39 ejects the cut blisters from around the steel rules 54.

It will thus be seen that the present invention accomplishes the objects hereof in that the cutting units are constructed and mounted in such a fashion that they accommodate any possible and reasonable shrinkage of sheet 20 from which the blisters are formed thereby enabling the blisters 22 to symmetrically reside in the cavities of the units. The blisters are severed in such a fashion that a symmetrical rim [34]24 is produced on the blisters.

Although this invention has been described in its preferred form with a certain degree of